

Australia sets price on carbon

Australia — one of the largest per capita greenhouse-gas emitters — has committed to reduce emissions significantly over coming decades, but will its new carbon policy succeed?

This month sees the commencement of Australia's much-vaunted Carbon Pricing Mechanism (CPM) aimed at significantly reducing its greenhouse-gas emissions. The centrepiece of Australia's climate change response, the CPM was pushed through the Australian legislature by Prime Minister Julia Gillard's ruling Labor party with help from the Green party and independents, despite concerted opposition from within Parliament and elsewhere. The CPM will start by introducing a fixed unit price on emissions and will be followed in 2015, if all goes to plan, by a cap-and-trade scheme. For those interested, the basic economics and financial instruments of the CPM are discussed by Frank Jotzo on page 475.

The CPM will be augmented with major initiatives to increase energy efficiency and promote the expanded use of renewable energy sources. Also in the package is a voluntary offset scheme intended to reduce emissions associated with agriculture and changes in land use — the so-called Carbon Farming Initiative. As discussed by Rodney Keenan and colleagues on page 477, the Australian government is acutely aware that its carbon policy should be based on sound scientific, environmental, social and economic principles. It has therefore established an independent Climate Change Authority tasked with monitoring progress and providing expert advice to policymakers.

The efforts made by Australia to incorporate independent scientific expertise in its governance arrangements should be lauded, as should its resolve to underpin its carbon policy with a clear and transparent legal framework. But, as noted by Jotzo, the policy lacks bipartisan support, and with national elections due in 2013 it may turn out to be short-lived.

This would be a great shame. The impacts on Australia of climate change resulting from global greenhouse-gas emissions caused by human activities are likely to be severe. A 2006 consultancy report prepared by CSIRO, Australia's national science agency, highlighted changes in regional precipitation patterns, coastal erosion through sea-level rise, and damage to the Great Barrier Reef and other biodiversity hotspots. It also made clear the challenges to water supply and management with consequences for forestry, agriculture and industry (<http://go.nature.com/xIzYKY>).

The report warned that expected increases in the frequency and severity of extreme events such as heatwaves and tropical cyclones could degrade the nation's infrastructure and public health.

At least in relation to extreme climatic events, some of these predictions may already be coming to pass. In February 2009, the country was ravaged by raging bush fires following an unprecedented heatwave. In December 2010, eastern Australia was deluged by heavy rain, which was followed by the wettest spring on record — and this when southwestern Australia had just experienced its driest recorded wet season. At present, Australians are seeing around twice as many record hot days as record cold days. Even the seas around Australia seem to be warming up rapidly.

But can the blame for extreme climatic events in Australia — or anywhere else for that matter — be firmly pinned on anthropogenic climate change? On page 491, Dim Coumou and Stefan Rahmstorf offer a tentative answer to this often-asked question. Based on review of the existing evidence, they argue that for some types of extremes — heatwaves and extreme precipitation events, in particular — specific events or increases in their numbers can be attributed to global warming. For other types of climatic extremes, such as storms, they find the evidence more equivocal, but argue nevertheless that we can plausibly expect an increase.

In June 1988, James Hansen of the National Aeronautics and Space Administration famously — some would say infamously — told a US congressional committee that "It is time to stop waffling so much and say that the evidence is pretty strong that the greenhouse effect is here" (<http://go.nature.com/EJMcBa>). Now more than 20 years later, Coumou and Rahmstorf conclude that "the evidence is strong that man-made, unprecedented heat and rainfall extremes are here — and are causing major human suffering." Even so, given the present state of play it would be premature — indeed foolish — to claim that humans are solely responsible for the many record events we have witnessed around the world over recent years, and the researchers are careful not to do so.

Apart from the obvious continuing role for natural variation in the Earth's climate system — some of it intrinsic and some of

it driven by external factors such as cycles of solar activity, and operating over many different timescales — much of the evidence for a link between weather extremes and global warming is necessarily statistical in nature. The apparently unprecedented nature of many recent meteorological events — at least in the context of historical observations — is strongly suggestive of such a link. However, in some cases it is possible to move beyond mere correlation. Indeed, although acknowledging that many uncertainties remain, some of the strongest evidence reviewed by Coumou and Rahmstorf comes from ensemble computer simulations underpinned by a good physical understanding of how the climate system works.

As is apparently well understood by Australia's present government, the precautionary principle would strongly suggest that we, the custodians of the planet, need urgently to start getting serious about reducing greenhouse-gas emissions and setting in place other mitigation and adaptation measures. And yet, as discussed by Anna Petherick (page 484) our appetite for carbon-intensive products remains unsated, and that despite having achieved legally binding commitments on emissions reductions, many countries effectively 'export' their carbon footprints through international trade.

There are many measures that could be taken to reduce emissions globally. On page 471, Kornelis Blok, Niklas Höhne, Kees van der Leun and Nicholas Harrison propose no less than 21 coherent major initiatives that together could reduce emissions equivalent to around 10 gigatonnes of carbon dioxide by 2020. This would effectively bridge the 'greenhouse-gas emissions gap' between what we emit now and targets set under the United Nations Framework Convention on Climate Change, and with the added benefit of enhanced reductions in air-pollutant emissions. Moreover, the researchers argue that the initiatives, which range from reducing emissions by large companies and megacities through to more efficient energy use in the kitchen, would have many tangible economic and environmental benefits. They therefore call for a 'grand coalition' to serve as a catalyst for change — change, that is, to which Australia has committed itself, at least for now. □